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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,409	06/08/2007	Duncan McKenzie	70444/UST	8461

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SYNGENTA CROP PROTECTION, INC.
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EXAMINER

BROWN, COURTNEY A

ART UNIT	PAPER NUMBER
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1617

NOTIFICATION DATE	DELIVERY MODE
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03/29/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

department-gso.patent@syngenta.com

Office Action Summary	Application No. 10/599,409	Applicant(s) MCKENZIE ET AL.	
	Examiner COURTNEY BROWN	Art Unit 1617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9-28-06</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Status of Claims

Claims 1-11 and 13 are pending in the application. Claim 12 was cancelled in a preliminary amendment filed September 28, 2006. Claims **1-11 and 13** are being examined for patentability.

Priority

Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e), 119(a-d), or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. This application is a 371 of PCT/EP05/03457 filed on April 1, 2005.

Information Disclosure Statement

The Information Disclosure Statements (IDS) submitted on September 28, 2006 been considered by the examiner.

Claim Objections

Claim 4 is objected to because of the following informalities: Claim 4 recites "wherein the ratio of isomeric o-o to o,p-EDDHA is of from" which is grammatically improper. The Examiner suggests that the claim be amended to recite "wherein the ratio of isomeric o-o to o,p-EDDHA is from". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dawson et al. (US Patent 5,152,820) in view of Petree et al. (US Patent 4130582), Mar Gomez-Gallego et al. (*J. Agric. Food Chem*, 2002, 50,6395-6399, submitted on the IDS of 9/28/06) and Dexter (US Patent 2824128) further in view of Knell et al. (US Patent 2,921,847) and Hudetz (US Patent 6,271,177) as evidenced by Shakhashiri (Chemical of the Week, Agricultural Fertilizers: Nitrogen, Potassium, and Phosphorous).

Applicant's Invention

Applicant is claiming a mixture comprising isomeric N,N'-ethylene-bis(hydroxyphenyl)glycines, wherein the molar ratio of N,N'-ethylene-(2-hydroxyphenyl)glycyl-(4-hydroxyphenyl)glycine (o,p-EDDHA) to N,N'-ethylene-bis(2-hydroxyphenyl)glycine (o,o- EDDHA) is higher than 0.8 : 1.

***Determination of the scope and the content of the prior art
(MPEP 2141.01)***

Dawson et al. teach a composition that contains iron EDDHA and iron EDDHMA in an agrochemically-acceptable organic solvent which is used in treating iron deficiency in soils (abstract). Specifically, Dawson et al. teach that the iron chelate compounds of their invention is the chelate anion formed between ferric iron and the quadrivalent anion of ethylenediamine-N,N'-di-(o-hydroxyphenyl acetic acid), ethylenediamine-N,N'-di-(p-hydroxyphenyl acetic acid) or ethylenediamine-N-o-hydroxyphenyl acetic acid-N'-p-hydroxyphenyl acetic acid. Dawson et al. teach that commercially-available materials often contain mixtures of the ortho, para and ortho-para isomers and that although the chelating powers of the three isomers may vary considerably, the expression "iron EDDHA" as used covers any compound which contains, in addition to a cation or two or more different cations, a monovalent anion in which ferric iron is chelated by the EDDHA anion in any one or more of its isomeric forms, and mixtures of such compounds. (column 1, lines 9-27, limitation of instant claims **1-4 and 8**).

***Ascertainment of the difference between the prior art and the claims
(MPEP 2141.02)***

One difference between the invention of the instant application and that of Dawson et al. is that Dawson et al. do not expressly teach a process of preparation comprising: a.) reacting phenol simultaneously in a three component reaction with ethylenediamine and glyoxylic acid while selecting the reaction conditions in a way that

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directs the isomeric ratio of the generated EDDHA to be higher than 0.8 : 1 (limitation of instant claims **1-4 and 5**); **b.**) reacting hydroxybenzaldehyde with diaminoethane in a first step, reacting the resulting aldimine with hydrocyanic acid and hydrolyzing the resulting intermediate to yield the end-product (limitation of instant claim **6**) and **c.**) conversion of o,o-EDDHA into o,p-EDDHA by changing the pH value at elevated temperature (limitation of instant claim **7**). However, these preparation processes were known in the prior art. For example: **a.**) Petree et al. teach a process for the preparation of phenolic ethylenediamine polycarboxylic acids in predominantly the ortho isomeric form which comprises reacting a phenol compound, ethylenediamine, glyoxylic acid and a base, said phenol compound functioning both as a reactant and as the sole solvent for the reaction system (abstract); **b.**) Mar Gomez-Gallego et al. teach a synthetic route for o,p-EDDHA starting from substituted benzaldehydes and ethylenediamine (see Figure 3) and **c.**) Dexter et al. teach the synthesis of EDDHA by heating the resulting mixture of components for 7 hours at 70 degrees Celsius while maintaining a pH of 8.5 (see Example 1, column 2, line 65 bridging to column 3, lines 1-7).

Another difference between the invention of the instant application and that of Dawson et al. is that Dawson et al. do not expressly teach a method of treating plant chlorosis in cultivated plants and the use of an additional plant nutrient or plant fertilizer or mixture thereof comprising 1 to 20 weight percent of urea, 0 to 50 % potassium oxide, an inorganic nitrate, or mixture thereof and a sulfonyl urea herbicide (limitation of instant claims **9-11 and 13**). However, compositions comprising N,N'-ethylene

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bis(hydroxyphenyl)glycines ,a fertilizer and a sulfonyl urea herbicide as well as the use of EDDHA for the treatment of plant chlorosis was known in the prior art. For example, Knell et al. teach ferrous and ferric chelates of ethylene bis(alphaimino-ortho-hydroxyphenylacetic acid) (i.e., APCA, EDDHA or N,N'-ethylene-bis(hydroxyphenyl)glycine) and in combination with a fertilizer in compositions that are used for the treatment or correction of iron deficiencies in growing plants and Dawson et al. teach that iron chlorosis is the plant malnutritional condition due to iron deficiency of various economic crops (see column 1, lines 15-60 ,column 2, lines 1-13 and column 7, lines 10-22)). As evidenced by , Shakhashiri, agricultural fertilizers comprise sources of nitrogen such as sodium nitrate, calcium nitrate and urea as well as sources of potassium such as potash (i.e., potassium oxide). In an analysis of a commercial fertilizer with an N-P-K rating of 15-30-15, Shakhashiri teaches that a weight percent of 15% potash and 8.2% urea nitrogen was present. Hudtz teaches compositions comprising sulfonyl urea herbicides and iron EDDHA (see abstract and column 6, line 57 bridging to column 7, lines 1-49).

Finding of prima facie obviousness

Rationale and Motivation (MPEP 2142-2143)

The teachings of Dawson et al., Petree et al., Mar Gomez-Gallego et al .and Dexrter et al. are directed to agricultural formulations comprising iron EDDHA chelates and/or processes for preparing iron EDDHA. Therefore, it would have been *prima facie*

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obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Dawson et al., Petree et al., Mar Gomez-Gallego et al. and Dexter et al. to arrive at different the preparation processes as instantly claimed. Petree et al. teach that by utilizing phenol both as a reactant and as the sole solvent in the reaction system, the resulting phenol ethylenediaminepolycarboxylic acid product mix contains predominant amounts of the ortho-isomeric form and that relying on the ortho directing capability of phenol, generally greater than about 85% of the product mix is represented by the ortho-substituted compound (column 2, line 61 bridging to column 3, lines 1-3). One would have been motivated to make this combination in order to receive the expected benefit of providing a product mixture that is predominantly ortho-substituted. Mar Gomez-Gallego et al. teach that the synthesis of a pure sample of o,p-EDDHA has enabled one of ordinary skill in the art to confirm that o,p-EDDHA/ Fe^{3+} complex is actually present in considerable amounts in commercial sample of o,o-EDDHA iron chelates (page 6398, column 2, paragraph 2). One would have been motivated to make this combination in order to receive the expected benefit of having a means to synthesize a pure sample of o,p-EDDHA/ Fe^{3+} and analyze its presence in an isomeric mixture of EDDHA. Further, Petree et al. teaches that the procedure of Dexter et al. (US Patent 2824128) produces a mixture of 20.8% ortho isomer and 79.2% para isomer of EDDHA (see column 5, lines 42-48). One would have been motivated to make this combination in order to receive the expected benefit of having a means to convert of o,o-EDDHA into o,p-EDDHA mixture of EDDHA. . Therefore, given the state of the art as evidenced by the teachings of the cited references, and absent any

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evidence to the contrary, there would have been a reasonable expectation of success in combining the teachings of the cited references to form a synthesis process of EDDHA, depending on one's desired result.

The teachings of Dawson et al., Knell et al. and Hudetz are directed to agricultural formulations comprising iron EDDHA chelates. Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Dawson et al., Knell et al. and Hudetz to arrive at a method of treating plant chlorosis in cultivated plants and the use of an additional plant nutrient or plant fertilizer or mixture thereof comprising 1 to 20 weight percent of urea, 0 to 50 % potassium oxide, an inorganic nitrate, or mixture thereof and a sulfonyl urea herbicide. Knell et al. teach that the use of an administration unit comprising iron APCA (i.e., iron EDDHA) dispersed in an innocuous vehicle such as a fertilizer enables an appropriate dose that is easily administered by soil application in a uniform manner (column 7, lines 19-39). Hudetz teaches that compositions comprising selective herbicides such as sulfonyl ureas and an iron compound (i.e., iron-EDDHA) protects cultivated plants, but not the weeds, from the phototoxic action of the herbicide while controlling weeds in crops of cultivated plants (column 1, lines 5-11). One would have been motivated to make this combination in order to receive the expected benefit of having a composition that treats plant iron deficiency which cures plant chlorosis as well as selectively killing weeds without killing or harming the cultivated plant with easy and uniform administration. Therefore, given the state of the art as evidenced by the teachings of the cited references, and absent any evidence to the contrary, there would have been a

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reasonable expectation of success in combining the teachings of the cited references to form an agrichemical composition.

With regards to the limitation of instant claim 4, wherein the mixture of isomeric o,o to o,-EDDHA is from 0.9:1 to 100:1, the prior art teachings do not specifically teach this ratio. However, Dawson et al. teach that, the expression "iron EDDHA" as used covers any compound which contains, a monovalent anion in which ferric iron is chelated by the EDDHA anion in any one or more of its isomeric forms, and mixtures of such compounds. Further, Petree et al. and Dexter et al. teach that there are established synthetic routes which enable one of ordinary skill in the art to obtain a desired isomeric ratio. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to create a mixture having the instantly recited 0.9:1 ratio. When faced with constituting a mixture, one of ordinary skill in the art would have been motivated by common sense to select a 0.9:1 ratio, a ratio which falls within the presently claimed range of ratios, with a reasonable expectation of success and as a starting point for performing routine optimization procedure. In the instant case, Dawson et al. teach that commercially-available materials often contain mixtures of the ortho, para and ortho-para isomers and that although the chelating powers of the three isomers may vary considerably, therefore, it would have been obvious to combine these components in a 0.9:1 ratio towards the optimization of the process of making a EDDHA isomeric mixture. It should be noted that as indicated in MPEP 2144.05: Generally, differences in concentration or temperature will not support the patentability

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of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Routine optimization is not inventive, and no evidence has been presented here to suggest that the selection of the claimed ratio was other than routine or that the results should be considered unexpected compared to the closest prior art.

In light of the forgoing discussion, the Examiner concludes that the subject matter defined by the instant claims would have been obvious within the meaning of 35 USC 103(a).

From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the teachings of the cited references, especially in the absence of evidence to the contrary.

Conclusion

No claims are allowed.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR Only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Courtney Brown, whose telephone number is 571-270-3284. The examiner can normally be reached on Monday-Friday from 8 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Fereydoun Sajjadi can be reached on 571-272-3311. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Courtney A. Brown
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Technology Center 1600
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/Janet L. Epps-Smith/
Primary Examiner, Art Unit 1633